

# SIMNET Semi-Automated Forces

(Version 3.x)

## Validation Checklist



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PERCEPTRONICS, INC.

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# **SIMNET Semi-Automated Forces**

## **(Version 3.X)**

### **Validation Checklist**

**DRAFT**

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## **PREFACE**

### **SIMNET: Advanced Technology for the Mastery of War Fighting**

SIMNET is an advanced research project sponsored by the Defense Advanced Research Projects Agency (DARPA) in partnership with the United States Army. Currently in its third year, the goal of the program is to develop the technology to build a large-scale network of interactive combat simulators. This simulated battlefield will provide, for the first time, an opportunity for fully manned platoon-, company-, and battalion-level units to fight force-on-force engagements against an appropriately scaled and realistic opposing force. Furthermore, it does so in the context of a joint, combined-arms environment, with the complete range of command and control and combat service support elements essential to combined-arms combat. All of the elements that can affect the outcome of a battle are represented in this engagement, with victory likely to go to that unit that is better able to plan, orchestrate, and execute its combined-arms battle. Whatever the outcome, combat units will benefit from this opportunity to practice collective, combined-arms, joint war fighting skills at a fraction of the cost of an equivalent exercise in the field.

While simulators to date have been shown to be effective for training specific military skills, their high costs have made it impossible to buy enough simulators to train the force fully. Further, because of the absence of a technology to link them together, they have not been a factor in collective, combined-arms, joint training. SIMNET addresses both of these problems by aiming its research at three high payoff areas, namely:

- Better and cheaper collective training for combined-arms, joint war fighting skills.
- A testbed for doctrine and tactics development and assessment in a full combined-arms, joint setting.
- A "simulate before you build" development model.

These payoffs are achievable because of recent breakthroughs in several core technologies that have been applied to the SIMNET program, including:

- High speed microprocessors.
- Parallel and distributed multiprocessing.
- Local area and long haul networking.
- Hybrid depth buffer graphics.
- Special effects technology.
- Unique fabrication techniques.

These technologies, applied in the context of "selective fidelity" and "rapid prototyping" design philosophies, have enabled SIMNET development to proceed at an unprecedented pace, resulting in the fielding of the first production units at Fort Knox, Kentucky, just three years into the development cycle.

In addition to the basic training applications, work is underway to apply SIMNET technology in the area of combat development to aid in the definition and acquisition of weapon systems. This is made possible because of the low cost of the simulators, the ease with which they can be modified, and the ability to network them to test the employment of a proposed weapon system in the tactical context (i.e., within the context of joint and combined-arms setting).

Work on SIMNET is being carried out by co-contractors Bolt Beranek and Newman, Inc. (BBN) and Perceptronics, Inc. Perceptronics is responsible for training analysis, overall system specification, and the physical simulators, and BBN is responsible for the data communication, computer-based distributed simulation, semi-automated forces, and the computer image generation (CIG) subsystems. The project is a total team effort.

DARPA is the DoD agency chartered with advancing the state-of-the-art in military technology by sponsoring innovative, high-risk, high-payoff research and development.

## INTRODUCTION

This Validation Checklist describes the functionality of the SIMNET Semi-Automated Forces (version 3.x) that has been implemented as of 15 December 1990. The Semi-Automated Forces (SAF) Validation Checklist is intended be used by the Government to validate the SAF deliverables under the SIMNET Bridge contract. The Checklist was developed by the authors of the SIMNET Semi-Automated Forces (version 3.x) Functional Specification (dated 18 April 1990). The authors reviewed the currently-implemented Semi-Automated Forces to determine which functions had been fully or partially implemented, and which functions remained to be implemented.

SIMNET is a research and development program, as compared with a system procurement program. A SIMNET functional specification provides guidance for the developers, and is not considered a system specification. Thus, the system as implemented may vary from the description provided in the functional specification. However, the exact functionality to be fully developed depends upon contractual requirements and the direction of the Contracting Officer. Additionally, several initial versions of the Semi-Automated Forces were developed prior to the preparation of the SAF Functional Specification. The Functional Specification was prepared to provide user-oriented focus to (1) the functions supported by the SAF, and (2) the *soldier-machine interface*. However, subsequent development of the Semi-Automated Forces was limited by the requirements that a fully-functional system be available at all times, and that the hardware suite for the SAF not be changed.

The organization of this SAF Validation Checklist follows the organization of the SAF Functional Specification. Thus, each function is addressed in the SAF Validation Checklist in a similar manner, and in the same order, as in the SAF Functional Specification.

Each checklist item in the SAF Validation Checklist has four parts. The first part is the title or name of the function. Each title is phrased as an action statement so that the reviewer can ask "Was this functionality implemented — yes or no."

The second part of each Checklist item is the "Criterion" statement that provides a more detailed description of the required functionality. This Criterion statement can be used by the evaluator to determine if the functionality has been implemented. The criterion statement is a synopsis of the function described in the SAF Functional Specification.

The third part is the "Status". There were three status statements used in the development of this document: Implemented, Partially Implemented, and Not Implemented.

"Implemented" means that, in the opinion of the designers, the simulation functionality identified in the SAF Functional Specification has been implemented. Functions labeled "Implemented" have been tested and verified by the designers.

"Partially Implemented" means that only certain portions of the specified functionality were implemented. Certain elements necessary for the complete functional capability have not been developed or installed; these missing items are explained in the subsequent "Comments" section.

"Not implemented" is self explanatory.

The last part of each Checklist item is the "Comments" section that is used to clarify any deviations of the implemented functional capability with the requirements in the SAF Functional Specification.

## 1 INITIALIZE SAFOR

### 1.1 Enter BattleMaster Mode

**Criterion:** The default mode of the SAF Workstation is the SAF Commander mode. To enter the BattleMaster mode, the SAF Workstation operator must select the **BattleMaster** option, and then enter a password. To return to the SAF Commander mode, the operator simply selects the **SAF Commander** option.

**Status:** Implemented satisfactorily as a variation from Functional Specification.

**Comment:** To leave the BattleMaster mode and enter the SAF Commander mode, the SAF Workstation operator does not select an option. Rather, the SAF Commander mode is entered automatically as soon as the battlefield entities are created on the SIMNET battlefield (see section 1.5 below).

### 1.2 Identify SAF Workstation Functions

**Criterion:** The BattleMaster can select the type of forces that are to be initialized and then commanded from the SAF Workstation. The BattleMaster can select any one or combination of BLUFOR or OPFOR units of the following types: Ground Maneuver, Rotary-Wing Air, or Fixed-Wing Air.

**Status:** Implemented satisfactorily as a variation from Functional Specification.

**Comment:** Rather than simply distinguishing between BLUFOR and OPFOR, the BattleMaster chooses three parameters, namely:

1. Battle Scheme (**Absolute** — all units are aligned as either US or USSR; or **Relative** — all units are aligned as either Offense or Defense);
2. Workstation Alignment (**Same** — all units created at the SAF Workstation are aligned to the same team; or **Mixed** — units created at the SAF Workstation can be aligned to different teams);
3. Battle View (**Commander** — the map displays only those vehicles that are aligned on the same team, or opposing vehicles that are in line-of-sight of the own team's vehicles; or **Omniscient** — the map displays all vehicles, regardless of alignment).

Additionally, the BattleMaster can restrict any marksmanship changes during an exercise, either allowing or disallowing marksmanship changes during the exercise.

Although ground and air units can be initialized together on a single SAF Workstation, they belong to a single battalion.

### **1.3 Initialize Battlefield Entities**

**Criterion:** The BattleMaster can initialize one or any combination of entire units and give them unique names. The following units can be initialized:

- |                           |  |
|---------------------------|--|
| 1. OPFOR Ground Maneuver  | Battalion(s) or the ancillary Regimental assets typically available to a Battalion commander;  |
| 2. OPFOR Rotary-Wing Air  | Division Helicopter Battalion or the ancillary CAA attack helicopter assets typically available to a maneuver battalion or regimental commander. |
| 3. BLUFOR Ground Maneuver | Compan(ies) or the ancillary Battalion assets typically available to a Company commander.  |
| 4. BLUFOR Rotary-Wing Air | Attack Battalion, Combat Support Company, Assault Company, or Air Cavalry Troops.  |

**Status:** Partially Implemented.

**Comment:** Battalion-, Company-, and Platoon-size units using either US, USSR, or both tactics can be initialized. Additionally, individual vehicles can be initialized. However, all entities belong to the same battalion, and cannot be given unique names. BLUFOR and OPFOR tactics and organizations are not referenced, rather the distinction is between US and USSR tactics and organizations.

For Rotary-Wing Air, attack and scout helicopter units can be initialized; however, transport helicopters (e.g., Combat Support Company) cannot be initialized.



## **1.4 Identify Battlefield Entities**

**Criterion:** The BattleMaster can task organize the battlefield entities that have been initialized into various combinations of organizations.

**Status:** Not Implemented.

**Comment:** Battlefield entities can be initialized as individual vehicles, platoons, companies, or a battalion — all operating under a single battalion. However, the initialized entities cannot be re-organized during initialization (or during an exercise) to fit the requirements of a specific OPOD/OPLAN. The following units can be initialized:

### **US (BLUFOR)**

#### **Battalion**

- Tank
- Mechanized Infantry

#### **Company**

- Mechanized Infantry Heavy
- Mechanized Infantry
- Tank
- Tank Heavy
- Attack RWA

#### **Platoon**

- Tank
- Mechanized Infantry
- ADA

#### **Flight of (2, 3, or 4)**

- Attack RWA
- Scout RWA
- FWA

#### **Vehicle**

- Tank – M1
- Infantry Vehicle – M2/3
- ADA – FAADS
- Attack RWA – AH-64
- Scout RWA – OH-58D
- FWA – A10

### **USSR (OPFOR)**

#### **Battalion**

- Tank
- Motorized Rifle

#### **Company**

- Motorized Rifle Reinforced
- Motorized Rifle
- Tank
- Havoc

#### **Platoon**

- Tank
- Motorized Rifle
- ADA

#### **Flight of (2, 3, or 4)**

- Havoc
- Hind
- FWA

#### **Vehicle**

- Tank – T72
- Infantry Vehicle – BMP
- ADA – ZSU-23
- RWA – Mi-24 Hind
- RWA – Mi-28 Havoc
- FWA – Su25,

## **1.5      Emplace Battlefield Entities and Specify Status**

**Criterion:**      The BattleMaster can specify for all initialized weapons platforms and units the following status:

1.    Unit Name,
2.    Initial location on the battlefield,
3.    Initial tactical formation on the battlefield,
4.    Initial loads of Class III (fuel),
5.    Initial loads of Class V (ammunition) supplies, and
6.    Initial maintenance condition of all vehicles.

**Status:**          Partially implemented as a variation from Functional Specification.

**Comment:**      The BattleMaster can specify the initial location of the battlefield entities by indicating the position (and orientation) on the map; however position is indicated in X,Y coordinates, rather than military standard UTM coordinates (however, all coordinates in the SAF Commander mode are shown as both X,Y and UTM coordinates). The BattleMaster does not specify the initial tactical formation. Rather, he specifies the initial Combat Instruction Set, which includes the tactical formation. Additionally, the BattleMaster can specify the vehicle/unit orientation (i.e., bearing) and marksmanship (i.e., hit probability).

All SAF vehicles are automatically initialized with full loads of fuel and ammunition. Stochastic failures are not modelled in the Semi-Automated Forces, thus, initial maintenance status is not specified.

After the BattleMaster has emplaced the battlefield entities and specified the status for each, he is also required to create the entities on the SIMNET network. When the battlefield entities have been created on the network, the SAF Workstation changes automatically to the SAF Commander mode.

## **2 OPERATE SAFOR**

### **2.1 Organize Forces**

#### **2.1.1 Cross Attach Units**

##### **2.1.1.1 Send Units To or Receive Units from Other Workstations**

**Criterion:** The SAF Commander can task organize by transferring vehicles or units from one SAF Workstation to another. Ground maneuver units may be sent from one Battalion to another Battalion. Rotary-wing assets may be sent to provide Direct Support of ground maneuver units.

**Status:** Not Implemented

**Comment:** See comment in section 2.1.1.2 below.

##### **2.1.1.2 Transfer Units within the Same Workstation**

**Criterion:** The SAF Commander can task organize by transferring vehicles or units among other being commanded from the same SAF Workstation. Ground maneuver units may be sent from one Battalion to another Battalion. Rotary-wing assets may be sent to provide Direct Support of ground maneuver units.

**Status:** Not Implemented

**Comment:** In the current implementation of the SAF software, the SAF Commander is not able to task organize units (e.g., cross attach units or create new units from remnants of battle-damaged units). This is a capability that is critical to effective warfighting, and should be developed in future implementations of the SAF software.

### **2.1.2 Create/Modify CEOI**

**Criterion:** The communication nets for the units being controlled by the SAF Workstation are created automatically, in a doctrinal manner to conform to the task organization, when the unit(s) are created or cross-attached. The network connections are displayed when the SAF Commander selects the Communications & Electronics Operating Instructions (CEOI) option.

**Status:** Partially implemented.

**Comment:** The communications nets are created automatically; however, the net connections cannot be displayed to the SAF Commander.

## **2.2 Command Forces**

The SAF can be used by commander(s) operating with or without their staffs. The Semi-Automated Forces are commanded by issuance of military orders. Since the SAF entities are not human, not all parts of an order are required. However, all the information required by the SAF entities to execute a tactical evolution must be provided. The language used by the SAF Commander to provide this information is in the form of an Operations Order or Operations Plan (OPORD/OPLAN). The four parts of the OPORD that are passed to the Semi-Automated Forces include (1) intelligence, (2) subordinate unit tasking, (3) control measures, and the CEOI.

The behavior of SAF units can be controlled in five ways, including:

1. Combat Instruction Sets that are:
  - assigned by the BattleMaster during initialization,
  - assigned by the SAF Commander during
    - Subordinate Unit Tasking or
    - Immediate Intervention,
  - invoked by Control Measure(s) on an Operations Overlay, or
  - triggered by situational events;
2. The SAF Commander issues an Operations Overlay with Control Measures;
3. The SAF Commander issues Subordinate Unit Tasking(s);
4. The SAF Commander issues Coordinating Instructions; and
5. The SAF Commander issues "Immediate Intervention" commands.

### **2.2.1 Assign Combat Instruction Sets**

The first method by which Semi-Automated Forces units are controlled is by Combat Instruction Sets that are (1) assigned by the BattleMaster during initialization, (2) assigned by the SAF Commander during Subordinate Unit Tasking or Immediate Intervention, (3) invoked by Control Measure(s) on an Operations Overlay, or (4) triggered by situational events.

**Criterion:** SAF vehicles and units are always under the control of one of the Combat Instruction Sets (CISs). When SAF vehicles or units are moving, they can (1) encounter Control Measures that trigger them to change from one Combat Instruction Set to another, or (2) be given Subordinate Unit Tasking, which includes a Combat Instruction Set. When the SAF vehicles or units are stationary, Combat Instruction Sets are assigned through Subordinate Unit Tasking. A Combat Instruction Set defines the following attributes about the SAF's behavior:

1. Type of unit to which the CIS applies
2. Logical preceding CISs to the current CIS
3. Triggering event(s)
4. Move instructions:
  - Formation (i.e., geographical relationships among constituent vehicles)
  - Formation transitions
  - Destination
  - Speed
  - Time constraints
5. Shoot instructions
  - Engagement conditions
  - Surveillance instructions
  - Target priorities
6. Communication instructions
  - When to report
  - What to report
7. End state
8. Legitimate situational interrupts to the CIS

Company-level Combat Instruction Sets are provided for OPFOR SAF units, whereas platoon-level Combat Instruction Sets are provided for BLUFOR SAF units.

For OPFOR Ground Maneuver units, the following company-level Combat Instruction Sets are available:

1. Attack
2. Clear Area
3. CP Behavior
4. Hasty Attack
5. March – as a Forward Security Element
6. March – as an Internal Company
7. March – as a Rear Company
8. Occupy an Assembly Area
9. Occupy Battle Position
10. Pre-Battle Formations
11. React to Air Raid
12. Reconnoiter
13. Roadmarch
14. Withdraw

For BLUFOR Ground Maneuver units, the following platoon-level Combat Instruction Sets are available:

1. Air Defense
2. Assault
3. Assault – Dismounted
4. Assault – Mounted
5. Assault – Support by Fire
6. Clear Area
7. CP Behavior
8. Move in Combat Formations
9. Move using Overwatch
10. Occupy Battle Position/Assembly Area – Company
11. Occupy Battle Position/Assembly Area – Platoon
12. Reconnoiter
13. Roadmarch
14. Tactical Halt
15. Withdraw

For Rotary-Wing Air units, the following Combat Instruction Sets are available:

1. Air Preparation in Offense & Counter Preparation in Defense
2. Close Air Support (CAS) in Offense & Defense
3. Enemy Attack while Aircraft are on the Ground
4. FARP Behavior
5. Fly Enroute
6. Hold
7. Occupy Assembly Area
8. Occupy Battle Position
9. Pre-Battle Formations
10. React to Air Defense Attack
11. React to Enemy Air Attack while Aircraft Flying
12. Reconnoiter
13. Withdraw

For Fixed-Wing Air units, the following Combat Instruction Sets are available:

1. Attack Aircraft
2. Attack Ground Targets
3. Combat Air Patrol
4. Defend Against AAA
5. Defend Against Aircraft
6. Defend Against SAM
7. Egress
8. Ingress
9. Holding

**Status:** Partially implemented

**Comment:** For OPFOR Ground Maneuver Units, the following CISs have been implemented:

**Company:**

1. Attack
4. Hasty Attack
6. March – as an Internal Company
7. March – as a Rear Company
8. Occupy an Assembly Area
9. Occupy Battle Position
11. React to Air Raid
13. Roadmarch
14. Withdraw

The following company CISs have also been implemented:

- Pre-Battle wedge
- Pre-Battle line
- Pre-Battle vee

**Platoon:** The following platoon CISs (which are identical to the BLUFOR platoon CISs) have been implemented:

- Action Drill
- Assault
- Occupy Assembly Area
- Occupy Battle Position
- Roadmarch
- Withdraw



For BLUFOR Ground Maneuver Units, the following CISs have been implemented:

**Platoon:**

- 2. Assault
- 13. Roadmarch
- 15. Withdraw

The following platoon CISs have also been implemented:

- Action Drill
- Occupy Assembly Area
- Occupy Battle Position

**Company:** The following company CISs (which are identical to the BLUFOR company CISs) have been implemented:

- Attack
- Hasty Attack
- March – as an Internal Company
- March – as a Rear Company
- Occupy an Assembly Area
- Occupy Battle Position
- React to Air Raid
- Roadmarch
- Withdraw
- Pre-Battle wedge
- Pre-Battle line
- Pre-Battle vee

The substitution of OPFOR platoon-level CISs by the BLUFOR platoon-level CISs is probably acceptable, since OPFOR platoon commanders may occasionally exercise the degree of freedom exhibited by BLUFOR platoon commanders. However, the substitution of OPFOR company-level CISs by the BLUFOR company-level CISs is not acceptable. OPFOR company commanders do not exercise the degree of independent decision making that is afforded to BLUFOR company commanders.

For Rotary-Wing Air Units (BLUFOR and OPFOR), the following CISs have been implemented:

Flight of 2, Flight of 3, or Flight of 4:

2. Close Air Support
5. Fly Enroute
6. Hold
11. React to Air Attack while in the Air  
React to Air Attack while on the Ground

The following Flight CISs have also been implemented:

- Occupy Assembly Area
- Occupy Battle Position

For Fixed-Wing Air Units (BLUFOR and OPFOR), the following CISs have been implemented:

- Hold
- Fly Enroute
- Attack Ground Target

## **2.2.2 Prepare Overlays**

The second method by which Semi-Automated Forces units are controlled is by Operations Overlay(s) with Control Measures that are issued by the SAF Commander.

### **2.2.2.1 Prepare Intelligence Overlay**

**Criterion:** The SAF Commander can create and/or modify intelligence data in the form of map overlays, with standard military unit symbols indicating the types and sizes of observed "enemy" units. The Intelligence Overlay is automatically updated by incoming reports from subordinate units of enemy sightings, or can be updated (i.e., modified) manually by the SAF Commander. The Intelligence Overlay has no effect on the behavior of the Semi-Automated Forces. Rather it is a method for the SAF Commander to summarize intelligence information.

**Status:** Not Implemented

**Comment:** None.

#### **2.2.2.1.1 Name Overlay**

**Criterion:** In creating an Intelligence Overlay, the SAF Commander can give the overlay a unique name. The names of all previously-created intelligence overlays are available so that the SAF Commander can select which overlay to show on the map display.

**Status:** Not Implemented

**Comment:** None.

#### **2.2.2.1.2 Input/Modify Intelligence Data**

##### **2.2.2.1.2.1 Input/Modify Tactical Symbols**

**Criterion:** The SAF Commander can add, move, or remove tactical symbols from the Intelligence Overlay.

**Status:** Not Implemented

**Comment:** None.

## **2.2.2.1.2.2          Retrieve and Review Spot Reports**

### **2.2.2.1.2.2.1          Access From Message Log**

**Criterion:**      The SAF Commander can retrieve and review spot reports by "pointing to" any the report in the Message Log.

**Status:**          Implemented

**Comment:**      The entire Message Log is always available. The SAF Commander can scroll through the log to review any messages that have been received.

### **2.2.2.1.2.2.2      Access From Overlay**

**Criterion:**      The SAF Commander can retrieve and review spot reports by "pointing to" any tactical symbol(s) on the Intelligence overlay, which causes the spot report that generated that tactical symbol to appear (or to be highlighted).

**Status:**          Not Implemented

**Comment:**      None.

### **2.2.2.1.3          Store/Retrieve Overlay**

**Criterion:**      The SAF Commander can save any Intelligence Overlay and can retrieve it for later review.

**Status:**          Not Implemented

**Comment:**      None.

### **2.2.2.2 Prepare Operations Overlay**

The SAF Commander prepares an Operations Overlay by first selecting the **Operations Overlay** paragraph from the Operations Order display.

#### **2.2.2.2.1 Name Overlay**

**Criterion:** The SAF Commander can create an Operations Overlay and give the overlay a unique name. The names of all previously-created Operations Overlays are available so that the SAF Commander can select which overlay to show on the map display. The SAF Commander can also delete previously-created Operations Overlays.

**Status:** Implemented.

**Comment:** All functions of creating and naming an overlay have been implemented. The SAF Commander can also delete an Operations Overlay during the current exercise. However, any unit(s) that is currently operating under the now deleted overlay will continue to operate according to the orders implicit in the overlay. They will continue operating until the SAF Commander issues a Subordinate Unit Tasking, or until he issues a new Operations Overlay to the unit(s). All overlays created during an exercise are deleted at the end of the exercise, unless the exercise is explicitly saved.

## **2.2.2.2.2 Input/Modify Control Measures**

### **2.2.2.2.2.1 Input Points**

#### **2.2.2.2.2.1.1 Input Points (Ground Maneuver Units)**

**Criterion:** While creating or modifying an Operations Overlay for a Ground Maneuver Unit, the SAF Commander can input a new Point, or modify the location or parameters of an existing Point. In addition to the geographic location of the Point on the map, the following parameters apply to a Point:

1. Point Name,
2. Applies to Units: ...,
3. Change Speed to ...,
4. Report,
5. Wait for Unit: ...,
6. Change Pre-Battle Position to: ...,
7. Rearm and/or Refuel Here,
8. Report to New Unit: ...,
9. Dismount Infantry at this Point, and
10. Execute Combat Instruction Set ... here.

**Status:** Partially implemented

**Comment:** A Point can be placed at a geographic location on the map. The following parameters of a Point have been implemented:

1. Point Name,
2. Applies to Units: ...,
3. Change Speed to ...,
4. Report,
10. Execute Combat Instruction Set ... here.

The following can be accomplished by executing the appropriate CIS at the Point:

6. Change Pre-Battle Position to: ... .

#### **2.2.2.2.1.2 Input Points (RWA Units)**

**Criterion:** While creating or modifying an Operations Overlay for a Rotary-Wing Air Unit, the SAF Commander can input a new Point, or modify the location or parameters of an existing Point. In addition to the geographic location of the Point on the map, the following parameters apply to a Point:

1. Point Name,
2. Attached to Route ...,
3. Applies to Units: ...,
4. Change Speed to ...,
5. Change Altitude to ...,
6. Change Pre-Battle Position to: ...,
7. Rearm and/or Refuel Here,
8. Report to New Unit: ...,
9. Hold ...,
10. Change Enroute Movement Technique ... here,
11. Execute Combat Instruction Set ... here.

**Status:** Partially implemented.

**Comment:** A Point can be placed at a geographic location on the map. The following parameters of a Point have been implemented:

1. Point Name,
2. Attached to Route ...,
3. Applies to Units: ...,
4. Change Speed to ...,
5. Change Altitude to ...,
11. Execute Combat Instruction Set ... here.

The following can be accomplished by executing the appropriate CIS at the Point:

6. Change Pre-Battle Position to: ...,
9. Hold ... .

## **2.2.2.2.2.2 Input Lines**

### **2.2.2.2.2.1 Input Lines (Ground Maneuver Units)**

**Criterion:** While creating or modifying an Operations Overlay for a Ground Maneuver Unit, the SAF Commander can input a new Line, or modify the location or parameters of an existing Line. In addition to the geographic location of the Line on the map, the following parameters apply to a Line:

1. Line Name,
2. Applies to Units: ...,
3. Change Speed to ...,
4. Report,
5. Left Boundary of ... Units,
6. Right Boundary of ... Units,
7. Wait for Unit: ...,
8. Change Pre-Battle Position to: ...,
9. Report to New Unit: ...,
9. Dismount Infantry at this Line, and
10. Execute Combat Instruction Set ... here.

**Status:** Partially implemented.

**Comment:** A Line can be placed at a geographic location on the map. The following parameters of a Line have been implemented:

1. Line Name,
2. Applies to Units: ...,
3. Change Speed to ...,
4. Report,
10. Execute Combat Instruction Set ... here.

The following can be accomplished by executing the appropriate CIS at the Line:

8. Change Pre-Battle Position to: ... .



## **2.2.2.2.2.2 Input Lines (RWA Units)**

**Criterion:** While creating or modifying an Operations Overlay for a Rotary-Wing Air Unit, the SAF Commander can input a new Line, or modify the location or parameters of an existing Line. In addition to the geographic location of the Line on the map, the following parameters apply to a Line:

1. Line Name,
2. Left Boundary of ... Units,
3. Right Boundary of ... Units,
4. Applies to Units: ...,
5. Change Speed to ...,
6. Change Altitude to ...,
7. Report,
8. Change Pre-Battle Position to: ...,
9. Limit of Forward Advance,
10. Report to New Unit: ...,
11. Hold ...,
12. Change Enroute Movement Technique ...,
13. Execute Combat Instruction Set ... here.

**Status:** Partially implemented.

**Comment:** A Line can be placed at a geographic location on the map. The following parameters of a Line have been implemented:

1. Line Name,
4. Applies to Units: ...,
5. Change Speed to ...,
6. Change Altitude to ...,
7. Report,
13. Execute Combat Instruction Set ... here.

The following can be accomplished by executing the appropriate CIS at the Line:

8. Change Pre-Battle Position to: ...,
11. Hold ... .

#### **2.2.2.2.3 Input Routes**

**Criterion:** While creating or modifying an Operations Overlay, the SAF Commander can input a new Route, or modify the location or parameters of an existing Route. In addition to the geographic location of the Route on the map, the following parameters apply to a Route:

1. Route Name,
2. Start point of route is present position of Unit: ..., and
3. End point of route is present position of Unit: ... .

**Status:** Partially implemented

**Comment:** A Route can be placed at a geographic location on the map. The following parameters of a Route have been implemented:

1. Route Name.

In the current implementation, distinctions are made between Ground and Air routes. Within the category of Ground routes, distinctions are also made between Cross Country, Road, and Bridge routes. Within an Air route, an Elevation option is available. When creating a Road route, the system will automatically place the route along the most adjacent road.

#### **2.2.2.2.4 Input Areas**

**Criterion:** While creating or modifying an Operations Overlay, the SAF Commander can input a new Area, or modify the location or parameters of an existing Area. In addition to the geographic location of the Area on the map, the following parameters apply to an Area:

1. Area Name,
2. Applies to Units: ...,
3. Area Type: ... .

**Status:** Partially implemented

**Comment:** An Area can be placed at a geographic location on the map. The following parameters of an Area have been implemented:

1. Area Name,
2. Applies to Units: ...

Additionally, the following parameters can be specified:

- Change Speed to ...,
- Change Altitude to ...,
- Report,
- Execute Combat Instruction Set ... here.

As currently implemented, a unit reaching an Area can also be ordered to execute any Combat Instruction Set. However the SAF Functional Specification indicated that "Occupy Assembly Area" or "Occupy Battle Position" were the only Combat Instruction Sets associated with an Area

#### **2.2.2.2.2.5 Input Zones**

**Criterion:** While creating or modifying an Operations Overlay, the SAF Commander can input a new Zone, or modify the location or parameters of an existing Zone. In addition to the geographic location of the Zone on the map, the following parameters apply to a Zone:

1. Zone Name,
2. Applies to Units: ...,
3. Zone Type: ... .

**Status:** Partially implemented

**Comment:** A Zone can be placed at a geographic location on the map. The following parameters of a Zone have been implemented:

1. Zone Name,
2. Applies to Units: ... .

Additionally, the following parameters can be specified:

- Change Speed to ...,
- Change Altitude to ...,
- Report,
- Execute Combat Instruction Set ... here.

As currently implemented, a unit reaching a Zone can also be ordered to execute any Combat Instruction Set. However the SAF Functional Specification indicated that the "Reconnaissance Patrol" is the only Combat Instruction Set to be associated with a Reconnaissance/Surveillance Zone.

As currently stated in the Functional Specification, a "No Fire Zone" is not defined. However, this zone is of particular importance, and should be included in future implementations of the SAF software. Such a No Fire Zone should be defined in terms of the following parameters:

1. Zone Name,
2. Applies to Units: ...,
3. Zone Type: No Fire,
4. Time Zone is active.

#### **2.2.2.2.3 Store/Retrieve Overlay**

**Criterion:** The SAF Commander can save any Operations Overlay and can retrieve it for later review.

**Status:** Implemented satisfactorily as a variation from Functional Specification.

**Comment:** The SAF Commander does not save an Operations Overlay. Rather, it is saved automatically when it is first created, after the SAF Commander clicks **Done**. The SAF Commander can retrieve any previously-created Operations Overlay.

#### **2.2.2.2.4 Delete an Overlay.**

**Criterion:** The SAF Commander can cancel an order by deleting an Operations Order or by deleting (or modifying) a Control Measure associated with an Operations Order.

**Status:** Implemented

**Comment:** None.

#### **2.2.2.3 Prepare Fire Support Overlay**

**Criterion:** The SAF Commander can create and/or modify Fire Support data in the form of map overlays, with standard control measures to indicate planned fires. The Fire Support Overlay has no effect on the behavior of the Semi-Automated Forces. Rather, it is a method for the SAF Commander to summarize Fire Support information.

**Status:** Not Implemented

**Comment:** None.

#### **2.2.2.3.1 Name Overlay**

**Criterion:** In creating a Fire Support Overlay, the SAF Commander can give the overlay a unique name. The names of all previously-created Fire Support overlays are available so that the SAF Commander can select which overlay to show on the map display.

**Status:** Not Implemented

**Comment:** None.

#### **2.2.2.3.2 Input/Modify Fire Support Control Measures**

**Criterion:** The SAF Commander can add, move, or remove tactical symbols from the Fire Support Overlay.

**Status:** Not Implemented

**Comment:** None.

#### **2.2.2.3.3 Store/Retrieve Overlay**

**Criterion:** The SAF Commander can save any Fire Support Overlay and can retrieve it for later review.

**Status:** Not Implemented

**Comment:** None.

#### **2.2.2.4 Distribute Overlays**

##### **2.2.2.4.1 Print Overlays**

**Criterion:** The SAF Commander can print any Intelligence, Operations, or Fire Support Overlay.

**Status:** Not Implemented

**Comment:** None.

##### **2.2.2.4.2 Send Overlays**

**Criterion:** The SAF Commander can send electronically to any other SAF Workstation any Intelligence, Operations, or Fire Support Overlay.

**Status:** Partially implemented

**Comment:** Operations overlays can be sent using the **Save/Load Overlays** command.

### **2.2.3 Assign Subordinate Unit Tasks**

The third method by which Semi-Automated Forces units are controlled is by Subordinate Unit Tasking(s) that is invoked by the SAF Commander.

#### **2.2.3.1 Select Overlay**

**Criterion:** To assign a Subordinate Unit Task to a unit, the SAF Commander can select an Operations Overlay.

**Status:** Implemented satisfactorily as a variation from Functional Specification.

**Comment:** The SAF Commander does not first select an Operations Overlay, and then select the unit(s) to which it will apply. In the current implementation of the SAF software, the SAF Commander first selects the unit(s) and then selects the Operations Overlay.

#### **2.2.3.2 Select Unit**

**Criterion:** To assign a Subordinate Unit Task to a unit, the SAF Commander can select one or more SAF units.

**Status:** Implemented satisfactorily as a variation from Functional Specification.

**Comment:** The SAF Commander does not first select an Operations Overlay, and then select the unit(s) to which it will apply. In the current implementation of the SAF software, the SAF Commander first selects the unit(s) and then selects the Operations Overlay.

#### **2.2.3.3 Assign Task**

##### **2.2.3.3.1 Assign Initial Combat Instruction Set**

**Criterion:** The SAF Commander can assign to a subordinate unit an initial Combat Instruction Set from the full list of available CISs.

**Status:** Implemented

**Comment:** To assign a CIS to a subordinate unit, the SAF Commander must first identify himself as the unit commander (i.e., the SAF Commander clicks on the superior unit, and then tasks the subordinate unit[s]).



#### **2.2.3.3.2 Assign Route**

**Criterion:** The SAF Commander can assign to a subordinate unit a route that the unit is to use in performing the initial Combat Instruction Set. Any control measures placed along the route may cause the applicable Combat Instruction Set to change.

**Status:** Implemented

**Comment:** None.

#### **2.2.3.3.3 Assign Start Time**

**Criterion:** The SAF Commander can specify the time at which the SAF unit is to begin executing the Combat Instruction Set along the assigned route. The time is specified in relation to H-Hour.

**Status:** Not implemented

**Comment:** There is no concept of time implemented in the SAF software. All time functions are performed manually by the SAF Commander and/or his staff.

#### **2.2.3.3.5 Assign Command Post Tasking**

**Criterion:** The SAF Commander can specify the position of the Command Post vehicles during CIS formation movements.

**Status:** Not implemented

**Comment:** Command Post vehicles are not implemented in the SIMNET software, nor do they exist as simulators.

#### **2.2.3.3.6 Assign Execution Status**

**Criterion:** The SAF Commander can specify that a Subordinate Unit Task be **Warned** or **Executed Immediately**.

**Status:** Partially implemented

**Comment:** The task can be **Warned** or **Executed Immediately**; however, there is no penalty for not warning a task.

## **2.2.4 Issue Coordinating Instructions**

The fourth method by which Semi-Automated Forces units are controlled is by Coordinating Instructions(s) that is issued by the SAF Commander.

### **2.2.4.1 Specify H Hour**

**Criterion:** The SAF Commander can specify the time for all time-tagged events by establishing the H-Hour.

**Status:** Not implemented

**Comment:** There is no concept of time implemented in the SAF software. All time functions are performed manually by the SAF Commander and/or his staff.

### **2.2.4.3 Specify Base Unit**

**Criterion:** The SAF Commander can specify a unit as the "Base Unit" from which all other units "guide on." Alternatively, the SAF Commander can specify that all units will maintain contact with adjacent units, either left-to-right, or right-to-left, as the basis for movement rates.

**Status:** Not implemented

**Comment:** None.

## **2.2.5 Intervene Immediately**

The fifth method by which Semi-Automated Forces units are controlled is by Immediate Intervention(s) that is issued by the SAF Commander.

**Comment:** As implemented in the SAF software, an Immediate Intervention is called a TAC/E (for Tactical Emergency). This nomenclature is easier to pronounce and is tactically correct.

### **2.2.5.1 Designate Unit**

**Criterion:** To issue an Immediate Intervention to a unit, the SAF Commander can select one or more SAF units.

**Status:** Implemented satisfactorily as a variation from Functional Specification.

**Comment:** The SAF Commander does not first select a unit and then select the commands to apply to that unit. In the current implementation of the SAF software, the SAF Commander first selects the command(s) and then selects the unit(s) to which it will apply.

### **2.2.5.2 Give Command**

**Criterion:** To issue an Immediate Intervention to a unit, the SAF Commander can select among a limited set of commands that will be executed immediately, including:

1. HOLD,
2. Engage Target(s) at ...,
3. Follow Unit: ...,
4. Change Speed to: ...,
5. Remount Infantry
6. Resume Pre-Planned Mission
7. Control Dismounted Infantry.

**Status:** Partially implemented

**Comment:** The following TAC/E commands have been implemented:

1. HOLD, [shown as **Halt** in the implementation]
4. Change Speed to: ...,
6. Resume Pre-Planned Mission.

Additionally, the following TAC/E commands are available

- Follow Vehicle
- [Change] Formation
- Go to Location
- Command from Simulator
- [Change] Rules of Engagement
- Face Direction
- Rejoin Unit
- Resupply
- Set Target Priorities

The Immediate Intervention (now TAC/E) commands were intended to be an extremely limited set of commands that would allow the SAF Commander to issue an order very rapidly. To do so, the list of choices should be severely limited. As implemented, the number of TAC/E commands is too large to be most effective in a time-constrained tactical environment. In future implementations of the SAF software, each TAC/E command other than the originally-listed set of seven (7) commands should be executed as a Combat Instruction Set. The newly-developed run-time CIS editor would allow the SAF Commander to create such CISs.

## **2.3 Support Forces**

### **2.3.1 Provide Fire Support**

**Criterion:** Fire Support is provided by the Management Command & Control (MCC) system.

**Status:** Implemented at the MCC.

**Comment:** None.

### **2.3.2 Provide Air Support**

**Criterion:** Air Support is provided by an Aviation SAF Workstation, and by the ALO station of the MCC system.

**Status:** Implemented at the MCC.

**Comment:** Air Support is provided by the ALO MCC console, or by an other SAF Workstation commanding Fixed Wing assets.

### **2.3.3 Provide Logistic Support**

**Criterion:** The Aviation SAF Commander can resupply at Fuel & Ammunition Resupply Points (FARPs), which are established, re-supplied, and controlled by the MCC system.

**Status:** Partially implemented.

**Comment:** The aviation vehicles can be rearmed and refueled. However, only individual vehicle can be rearmed and refueled through the TAC/E command. A Rearm/Refuel CIS should be developed, which will specify the behavior of the entire unit at the refueling point. This would eliminate the need for the SAF Commander to move and rearm/refuel individual vehicles.

FARPs have not yet been implemented. This capability will be included when the Aviation MCC is developed (scheduled for late Spring 1991).

### **2.3.3 Provide Engineer Support**

**Criterion:** Combat Engineer Support is provided by the Management Command & Control (MCC) system.

**Status:** Implemented in version 6.4.3 of the MCC system.

**Comment:** None.

## **2.4 Monitor Forces**

### **2.4.1 Review Messages**

**Criterion:** The SAF Commander can review reports from SAF units.

**Status:** Implemented

**Comment:** None.

## **2.4.2 Review Status Displays**

### **2.4.2.1 Review Unit Status**

#### **2.4.2.1.1 (OPFOR Ground Maneuver Units)**

**Criterion:** The SAF Commander can review the status of any vehicle(s) or unit(s) by querying the vehicles or units. The status display will show the following:

1. Unit Name,
2. Location: ...,
3. Formation:...,
4. Fuel Status
5. Ammo Status:
  - 125 mm Heat (Tank)
  - 125 mm APDS (Tank)
  - 30 mm
  - 25 mm
  - ATGM (BMP)
  - ATGM (DI)
  - SA-7
6. Unit Strength:
  - Tanks
  - BMPs
  - Infantry Platoons
  - ZSU-23s

**Status:** Partially implemented

**Comment:** The following status parameters have been implemented:

1. Unit Name,
2. Location: ...,
3. Formation:...,
4. Fuel Status
5. Ammo Status:
  - 125 mm (Tank)
  - 23 mm (AA)
  - 30 mm
  - 25 mm
  - Spandrel (BMP)
  - Gaskin (air-to-air missile)
6. Unit Strength: (shown as % of total unit strength, not subdivided by weapon type).

Additionally, the following status can be reported:

- Executing CIS: ... .

#### **2.4.2.1.2 (BLUFOR Ground Maneuver Units)**

**Criterion:** The SAF Commander can review the status of any vehicle(s) or unit(s) by querying the vehicles or units. The status display will show the following:

1. Unit Name,
2. Location: ...,
3. Formation:...,
4. Fuel Status
5. Ammo Status:
  - 105 mm Heat (Tank)
  - 105 mm APDS (Tank)
  - 30 mm
  - 25 mm
  - ATGM (BFV)
  - ATGM (DI)
6. Unit Strength:
  - Tanks
  - IFVs
  - Infantry Platoons
  - FAADS

**Status:** Partially implemented

**Comment:** The following status parameters have been implemented:

1. Unit Name,
2. Location: ...,
3. Formation:...,
4. Fuel Status
5. Ammo Status:
  - 105 mm (Tank)
  - 30 MM
  - 25 MM
  - TOW missile (BFV)
  - FAADS missile
6. Unit Strength: (shown as % of total unit strength, not subdivided by weapon type).

Additionally, the following status can be reported:

- Executing CIS: ...



#### 2.4.2.1.3 (OPFOR Rotary-Wing Air Units)

**Criterion:** The SAF Commander can review the status of any vehicle(s) or unit(s) by querying the vehicles or units. The status display will show the following:

1. Unit Name,
2. Location: ...,
3. Formation:...,
5. Executing CIS,
6. Direction of Flight,
7. Fuel Status,
8. Personnel Status,
5. Ammo Status:
  - 30 mm AP
  - 30 mm HEI
  - 57 mm Rocket
  - AT-6
  - SA-14/16
  - Chaff
  - Flares
6. Equipment Status:
  - Mi-24 Hind
  - Mi-28 Havoc

**Status:** Partially implemented

**Comment:** The following status parameters have been implemented:

1. Unit Name,
2. Location: ...,
3. Formation:...,
5. Executing CIS,
6. Direction of Flight,
7. Fuel Status,
8. Personnel Status,
5. Ammo Status:
  - 30 mm
  - 57 mm rocket
  - AT-6 Spiral
6. Equipment Status: (shown as % of total unit strength, not subdivided by weapon type).

Additionally, the following status can be reported:

- Executing CIS: ...

#### **2.4.2.1.4 (BLUFOR Rotary-Wing Air Units)**

**Criterion:** The SAF Commander can review the status of any vehicle(s) or unit(s) by querying the vehicles or units. The status display will show the following:

1. Unit Name,
2. Location: ...,
3. Formation:...,
5. Executing CIS,
6. Direction of Flight,
7. Fuel Status,
8. Personnel Status,
5. Ammo Status:
  - 20 mm
  - 30 mm
  - 50 cal
  - 2.75" Rocket
  - HELLFIRE
  - STINGER
  - TOW
  - Flares
6. Equipment Status:
  - OH-58C
  - OH-58D
  - AH-1
  - UH-60
  - AH-64
  - AH-64(LB)
  - M977
  - M978

**Status:** Partially implemented

**Comment:** The following status parameters have been implemented:

1. Unit Name,
2. Location: ...,
3. Formation:...,
5. Executing CIS,
6. Direction of Flight,
7. Fuel Status,
8. Personnel Status,
5. Ammo Status:
  - 30 mm
  - 50 cal
  - 2.75" Rocket
  - HELLFIRE

6. Equipment Status: (shown as % of total unit strength, not subdivided by weapon type).

Additionally, the following status can be reported:

- Executing CIS: ...

#### **2.4.2.1.5 (OPFOR and BLUFOR Fixed-Wing Air Units)**

**Criterion:** The SAF Commander can review the status of any vehicle(s) or unit(s) by querying the vehicles or units. The status display will show the following:

1. Unit Name,
2. Location: ...,
3. Formation:...,
5. Executing CIS,
6. Direction of Flight,
7. Fuel Status,
8. Personnel Status,
5. Ammo Status:
  - 30 mm
  - Maverick
  - Flares
  - Chaff
6. Equipment Status:
  - A-10
  - SU25

**Status:** Partially implemented

**Comment:** The following status parameters have been implemented:

1. Unit Name,
2. Location: ...,
3. Formation:...,
5. Executing CIS,
6. Direction of Flight,
7. Fuel Status,
8. Personnel Status,
5. Ammo Status:
  - 30 mm
  - TOW
6. Equipment Status: (shown as % of total unit strength, not subdivided by weapon type).

Additionally, the following status can be reported:

- Executing CIS: ...

#### **2.4.2.2 Review Commander's Status Display**

**Criterion:** The SAF Commander can review the status of all subordinate units by selecting a **Status** option on the Command Display

**Status:** Not implemented.

**Comment:** None.

#### **2.4.3 Review Overlays**

**Criterion:** The SAF Commander can review an overlay by displaying the overlay(s) on the Map Display.

**Status:** Implemented

**Comment:** None.

### **3 Suspend/Resume Operations**

#### **3.1 Halt Action**

**Criterion:** The SAF Commander can halt an exercise at any time, simultaneously "freezing" all existing conditions.

**Status:** Implemented

**Comment:** None.

#### **3.2 Store Present Conditions**

##### **3.2.1 Capture Exercise Conditions**

**Criterion:** The SAF Commander can save an exercise, including all overlays, current unit positions and dispositions, and taskings.

**Status:** Implemented

**Comment:** None.

##### **3.2.2 Name Exercise Condition File**

**Criterion:** The SAF Commander can assign a unique name to a saved exercise for later recall by name.

**Status:** Implemented

**Comment:** None.

### **3.3 Recall Exercise Condition File**

#### **3.3.1 Recall Condition File By Name**

**Criterion:** The SAF Commander can recall a previously-saved exercise by a unique name that was given when the exercise was saved.

**Status:** Implemented

**Comment:** None.

#### **3.3.2 Initialize Exercise to Named File Condition**

**Criterion:** The SAF Commander can initialize a previously saved and then recalled exercise to a specific condition, including the initial conditions.

**Status:** Not implemented.

**Comment:** The recalled exercise can be restarted from the last conditions when the previous exercise was saved. However, the exercise cannot be restarted at the initial conditions.

### **3.4 Resume Action**

**Criterion:** The SAF Commander can resume an exercise from the recalled point in the exercise.

**Status:** Partially implemented.

**Comment:** The exercise can be resumed from the recalled point. However, any mission information is not recalled. Thus, vehicles or units that were executing a CIS along a route would tend to go back to the start of the route. In this situation, the SAF Commander typically re-issues orders to each of the vehicles to proceed from the current positions.